PATENT
ATTORNEY DOCKET NO.: 041464-5018-01

#21

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:

Tomohiro KAWATA et al.

Application No.: 08/931,615 — Group Art Unit: 2743

Filed: September 16, 1997 — Examiner: Huyen Le

CPA Filed: May 24, 1999

For: SPEAKER UNIT

Commissioner for Patents
Washington, D.C. 20231

Sir:

APPELLANTS' BRIEF UNDER 37 C.F.R. § 1.192

This brief is in furtherance of the Notice of Appeal filed March 16, 2001, in connection with the above-identified application, and appealing the final rejections of claims 2-9, 14-16, and 20-29 by the United States Patent and Trademark Office in a final Office Action dated November 17, 2000. The fee required under 37 C.F.R. § 1.17(c) is being filed concurrently herewith. This brief is transmitted in triplicate.

1. THE REAL PARTIES IN INTEREST

The real parties in interest in this appeal are Pioneer Electronic Corporation, of Tokyo, Japan, and Tohoku Pioneer Electronic Corporation, of Yamagata-ken, Japan.

2. RELATED APPEALS AND INTERFERENCES

Appellants are not aware of any other appeals or interferences that will directly affect, will be directly affected by, or will otherwise have a bearing on, the decision in this appeal.

3. STATUS OF THE CLAIMS

The status of the claims is as follows:

Claims canceled: 1, 10-13, 17-19, and 30

Claims withdrawn from consideration but not canceled: None.

Claims pending: 2-9, 14-16, and 20-29

Claims allowed: None.

Claims rejected: 2-9, 14-16, and 20-29

Claims appealed: 2-9, 14-16, and 20-29

4. STATUS OF AMENDMENTS

An Amendment under 37 C.F.R. § 1.116 canceling claims 17 and 30 is being filed concurrently with this brief. All other amendments have been entered. A copy of the pending claims is attached as an Appendix to this brief.

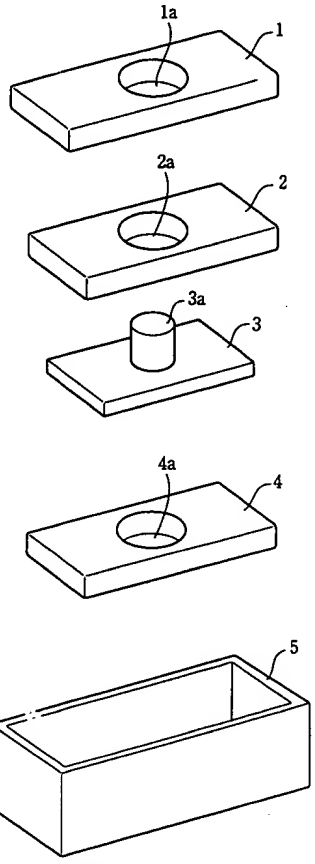
5. SUMMARY OF THE INVENTION

The present invention relates to a compact speaker unit that provides high magnetic flux density to the voice coil of the speaker, thereby achieving improved dynamic sensitivity and greater compactness over prior art speaker units. The speaker unit is particularly well suited for installation in a narrow space, such as beside a picture tube in a television cabinet. *See, e.g.,*

page 1, lines 5-7; page 5, lines 18-22; page 6, lines 5-14 (and Figs. 5a and 5b referenced therein); and page 6, line 21 – page 7, line 2 of Appellants' disclosure.

Appellants' Fig. 1, reproduced at right, illustrates a preferred embodiment of the invention. As depicted in Fig. 1, the speaker unit includes a rectangular top plate 1 made of magnetic material and having a center hole 1a; a rectangular plate-shaped magnet 2 having a center hole 2a; and a back plate 3 made of magnetic material and having an integrally formed center pole 3a. *See, e.g.,* page 3, line 22 – page 4, line 2 of Appellants' disclosure. As shown in Appellants' Fig. 3, reproduced below, the diameter of the center pole 3a is less than the respective diameters of the center holes 2a and 3a, so that when the rectangular top plate 1, rectangular plate-shaped magnet 2 and backplate 3 are stacked atop one-another to form a magnetic circuit, an annular air gap of center hole 6b is formed in the magnetic circuit between the center pole 3a and the wall of the center hole 1a. *See, e.g.,* page 3, line 22 – page 5, line 12 of Appellants' disclosure.

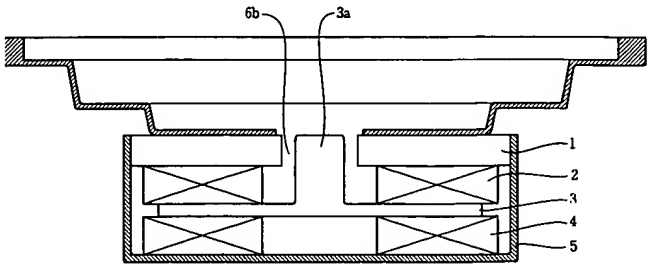
FIG.1



Appellants' Fig. 1

In operation, a cylindrical voice coil (not depicted in the figures) having a diameter larger than the diameter of the integrally-formed center pole 3a, but

FIG.3



Appellants' Fig. 3

smaller than the respective diameters of the center holes 1a and 2a, is positioned coaxially over the integrally-formed center pole 3a in the region of the air gap of center hole 6b of the magnetic circuit. *See, e.g.,* page 5, lines 12-15 of Appellants' disclosure. The cylindrical voice coil is secured at one end to a vibrating diaphragm (e.g., a speaker cone) that is movably supported by a frame structure 6. *Id.* When the voice coil is energized with a current representative of the sound to be reproduced, a magnetic field is generated in the voice coil windings that, through interaction with the magnetic flux present in the air gap, causes vibratory motion to be generated in the diaphragm, thereby generating sound pressure waves.

Referring again to Fig. 1, a second rectangular plate-shaped magnet 4 having a center hole 4a may be provided below the back plate 3 to cancel magnetic flux that may leak from the plate-shaped magnet 2. *See, e.g.,* page 4, lines 2-4 of Appellants' disclosure. Further, a case 5 made of magnetic material may be provided for receiving the magnetic circuit assembly and preventing leakage of magnetic flux. In a preferred embodiment, the top plate 1 also serves as the lid of the case 5, further shielding the surrounding environment from stray magnetic flux. *See, e.g.,* page 4, lines 5-12 of Appellants' disclosure.

Importantly, as illustrated in Fig. 1, each of the top plate 1, plate-shaped magnet 2, backplate 3, second plate-shaped magnet 4 and case 5 are *rectangular but not square* in shape. More particularly, they are each rectangular, and each have widths that are *substantially less than* their respective lengths. *See, e.g.,* Fig. 1 of Appellants' disclosure. Further, the top plate 1, the plate-shaped magnet 2, and the back plate 3 have respective widths that are equal to or narrower than the width of the frame structure 6, and have respective lengths that are equal to or shorter than the length of the frame structure 6, further providing a compact design. *See, e.g.,* page 6, lines 21-24 of Appellants' disclosure.

The advantages of this configuration over arrangements found in prior art speakers are noted in the specification. At page 1, lines 14-16, for example, the specification discusses a conventional speaker unit in which "a top plate and a permanent magnet each having a circular doughnut shape" is used. A stated advantage to this conventional configuration is that "it can provide a uniform magnetic flux to the surface of a cylindrical voice coil." Appellants' disclosure, page 1, lines 12-13.

Nonetheless, Appellants have recognized that the conventional use of a circular doughnut-shaped top plate and permanent magnet, in a speaker unit having an overall elongate shape, yields underperformance. That is, the speaker unit is far less sensitive than it could be given the elongate space which it occupies. As can be understood from the disclosure at page 1, lines 23-26, in order to fit properly within the speaker, the magnetic circuit defined by the circular doughnut-shaped top plate and permanent magnet must be smaller in size than the width of the short axis direction of the elongate vibrating diaphragm. This in turn limits the dimension of the magnetic circuit in the long axis direction, since by definition a circular doughnut-shaped structure can be no longer than it is wide.

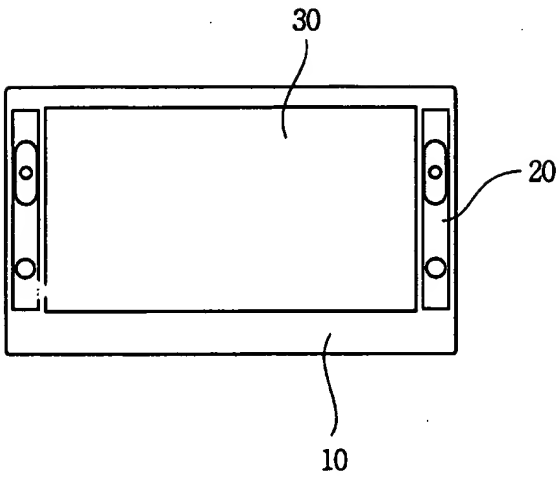
A direct result of the conventional speaker having a magnetic circuit that is of reduced size due to the limitations imposed by the width dimension in the short axis direction of the elongate vibrating diaphragm, is that "the magnetic flux to be applied to the surface of a voice coil will have a low density, resulting in a problem that the speaker unit has only a low sensitivity." Appellants' disclosure, page 1, line 23 – page 2, line 2. Thus, the conventional use of a circular doughnut-shaped magnetic circuit in an elongate speaker unit having short and long axis directions results in significant underperformance by the speaker unit.

These disadvantages associated with elongate speaker units in the prior art are overcome

by the novel speaker unit of the present invention, in which the length dimension of the magnetic circuit in the long axis direction is substantially greater than the width dimension of the magnetic circuit in the short axis direction. By configuring the speaker unit to include magnetic circuit structure that extends along with the entire length of an elongate speaker unit in the long axis direction, the present invention provides a higher density application of magnetic flux to the voice coil with a commensurate increase in speaker unit sensitivity and performance. Thus, speaker performance is greatly enhanced as compared to prior art elongate speaker units in which a circular (i.e., non-elongate) magnetic circuit is used.

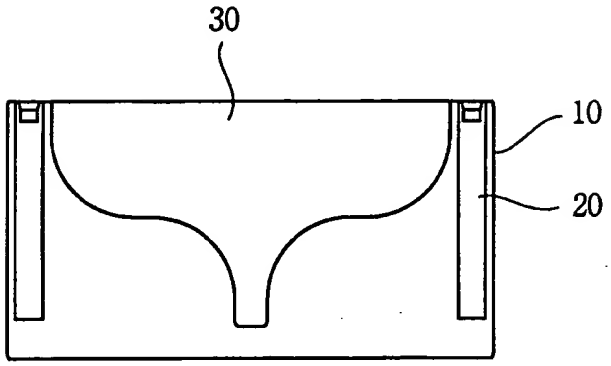
Accordingly, the novel magnetic circuit geometry of the present invention, which includes an elongate non-square rectangular plate-shaped magnet 2 having a larger volume and narrower shape than comparable prior art square-rectangular or cylindrically-shaped magnets, provides high magnetic flux density in the region of the air gap and voice coil, thereby achieving both improved dynamic sensitivity and greater compactness over prior art speaker units. *See, e.g.,* page 5, lines 18-22; page 6, lines 15-20 of Appellants' disclosure. Further, because of its compact geometry, the speaker unit is ideally suited for installation in a narrow space (e.g., the cabinet of a television set). *See, e.g.,* page 6, lines 11-14 and 24-26 of Appellants' disclosure, and especially 20 in Figs. 5a and 5b, reproduced below. Such dynamic sensitivity within a narrow television space of this size is not achieved using the aforementioned prior art elongate speakers because in such prior art speakers the magnetic circuit is circular and therefore does not extend along with the entire length of the long axis of the elongate speaker unit.

FIG.5 a



Appellants' Fig. 5a

FIG.5 b



Appellants' Fig. 5b

6. ISSUES

The following issues are presented on appeal:

A. Whether the rejections of claims 2-4, 6, 8-9, 15, 20 and 22-24 under 35 U.S.C. § 103(a) based on *Sariti* (U.S. Patent No. 3,079,472) in view of *Nakamura* (U.S. Patent No. 4,969,196) and the rejections of claims 5, 7, 14, 16, 21, and 25-29 under 35 U.S.C. § 103(a) based on *Sariti* in view of *Nakamura* and further in view of *Lee et al.* (UK Patent Application GB 2 278 251) or *Numa* (Japanese Publication No. 55-118299) should be reversed because none of *Sariti*, *Nakamura*, *Lee et al.*, or *Numa*, whether taken singularly or in combination, would have rendered the claimed invention as a whole obvious at the time of the invention to a person having ordinary skill in the art.

B. Whether the rejections of claims 2-4, 6, 8-9, 15, 20, and 22-24 under 35 U.S.C. § 103(a) based on *Sariti* in view of *Nakamura* and the rejections of claims 5, 7, 14, 16, 21, and 25-29 under 35 U.S.C. § 103(a) based on *Sariti* in view of *Nakamura* and further in view of *Lee*

et al. or *Numa* should be reversed because the Examiner has failed to establish a *prima facie* case of obviousness, since not all of the claimed limitations are taught or suggested by the prior art and, further, because the Examiner has not cited proper motivation that would lead a skilled artisan to combine the cited references.

7. GROUPINGS OF CLAIMS

Independent claims 4, 6, 20, and 25, and their dependent claims 2, 5, 7, 8, 14, 15, 16, 21, 22, 26, and 27, stand or fall together. Each of these claims requires a speaker unit wherein each of the top plate, the plate-shaped magnet and the back plate has a width and a length, each width being substantially less than each respective length, thereby permitting installation of the speaker unit in a narrow space. Each of these claims also requires a speaker unit comprising an elliptical vibrating diaphragm and a rectangular frame for movably supporting the vibrating diaphragm or a speaker unit comprising an elliptical vibrating diaphragm and a rectangular frame with an elliptical recess portion for movably supporting the vibrating diaphragm. Moreover, each of these claims requires a speaker unit comprising a back plate having an integrally formed upright pole on its center.

Independent claims 23 and 28, and their dependent claims 24 and 29, stand or fall together. Each of these claims requires a speaker unit wherein each of the top plate, the plate-shaped magnet and the back plate has a width and a length, each width being substantially less than each respective length, thereby permitting installation of the speaker unit in a narrow space. These claims also each require a speaker unit comprising an elliptical vibrating diaphragm and a rectangular frame with an elliptical recess portion for movably supporting the vibrating diaphragm.

Dependent claims 3 and 9 stand or fall together. In addition to the aforementioned combinations recited in their independent claims 4 and 6, respectively, dependent claims 3 and 9 each require that the speaker unit be installed on either side of a television set.

8. ARGUMENTS

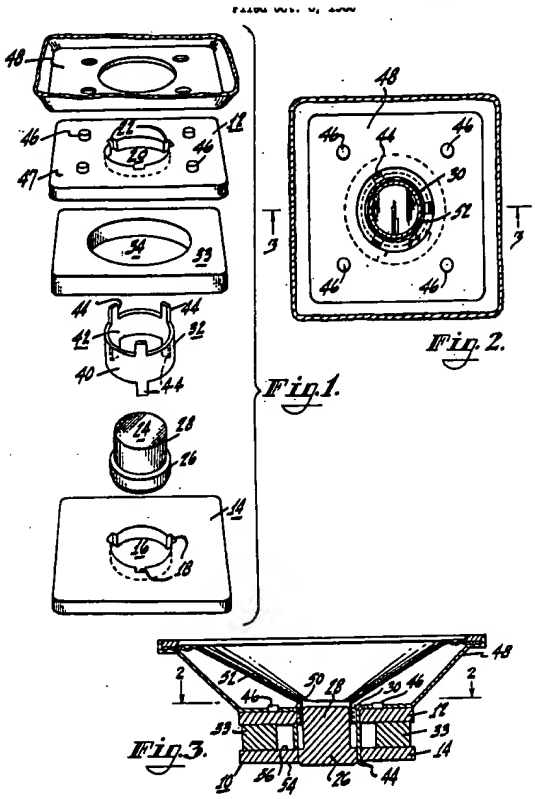
A. The Applied Art Fails to Render the Claimed Invention Obvious

The rejections of claims 2-4, 6, 8-9, 15, 20, and 22-24 under 35 U.S.C. § 103(a) based on *Sariti* in view of *Nakamura,* and the rejections of claims 5, 7, 14, 16, 21, and 25-29 under 35 U.S.C. § 103(a) based on *Sariti* in view of *Nakamura* and further in view of *Lee et al.* or *Numa,* should be reversed. None of *Sariti*, *Nakamura*, *Lee et al.*, or *Numa*, whether taken singularly or in combination, would have rendered the claimed invention as a whole obvious at the time of the invention to a person having ordinary skill in the art.

i. *Sariti* By Itself Does Not Render Claims 2-4, 6, 8-9, 15, 20, or 22-24 Obvious

Sariti is directed to a device and method of fastening together the components of a conventional magnetic circuit for a loudspeaker. *See* Figs. 1-3 of *Sariti*, reproduced below. In rejecting claims 2-4, 6, 8-9, 15, 20 and 22-24 under 35 U.S.C. § 103(a) based on *Sariti* in view of *Nakamura*, the Examiner asserts that "*Sariti* teaches a speaker unit which comprises a diaphragm (52), a cylindrical voice coil (50) secured on a center of the diaphragm, a rectangular frame (see the housing 48 in figures 1-2 and col. 2, lines 56-58), and a magnetic circuit formed by a rectangular top plate (12), a rectangular magnet (33) and a rectangular back plate (14) having an upright pole (24) in its center."[1] *See* Final Office Action (Paper No. 18) page 3, lines 5-9.

1. Later in the Office Action, however, the Examiner acknowledges that "*Sariti* does not specifically teach the diaphragm and the frame which have the elliptical portion as claimed." See Final Office Action (Paper No. 18) page 4, lines 1-2.



Figs. 1-3 of Sariti

The Examiner asserts that "[s]ince the magnetic circuit of *Sariti* is formed in a rectangular shape (col. 2, lines 56-58), the width of each of the top plate, the magnet and the back plate is *substantially less than* the length of each respective length as claimed." *See* Final Office Action (Paper No. 18), page 3, lines 16-18 (emphasis added). The Examiner relies on two portions of *Sariti* in support of this assertion: (1) the illustration of housing 48 in Figs. 1 and 2; and (2) the text set forth at column 2, lines 56-58. See Final Office Action (Paper No. 18), page 3, line 7. However, neither of these portions of *Sariti* supports the Examiner's contention that *Sariti* discloses Appellants' claimed combinations "wherein each of the top plate, the plate-shaped magnet and the back plate has a width and a length, each width being *substantially less than* each respective length, thereby permitting installation in a narrow space."

ii. The Examiner Incorrectly Relies on Figures 1 and 2 of *Sariti* as Expressly Showing the "Substantially Less Than" Limitation of the Claimed Invention

Certainly, the illustration of the housing 48 in Figs. 1 and 2 of *Sariti* does not support the Examiner's position. As depicted in Figs. 1 and 2 of *Sariti*, the housing 48 is square or, at the very least, substantially square. Accordingly, the housing 48, as depicted in Figs. 1 and 2 of *Sariti*, does not at all correspond to Appellants' claimed combinations "wherein each of the top plate, the plate-shaped magnet and the back plate has a width and a length, each width being *substantially less than* each respective length, thereby permitting installation in a narrow space."

To the contrary, the housing 48 as depicted in *Sariti* Figs. 1 and 2 is as far from such claimed combinations as a rectangle can be, because rather than having one side that is *substantially less than* another (as required by Appellants' claims), the sides of housing 48, as depicted in Figs. 1 and 2, are *the same or at best substantially the same.*

iii. The Examiner Incorrectly Relies on Column 2, Lines 56-58, of *Sariti* as Expressly Teaching the "Substantially Less Than" Limitation of the Claimed Invention

The text set forth at column 2, lines 56-58 of *Sariti* also does not support the Examiner's position. The text set forth at *Sariti* column 2, lines 56-58, states that "The magnet 33 is formed in substantially the same shape as the front and back plates 12 and 14 which can be rectangular, circular or of any other desired shape."

Appellants first of all note that this portion of *Sariti* does not differentiate between the square structure 48 shown in Figs. 1 and 2 and any other type of rectangle. For example, at column 2, lines 56-58, *Sariti* does *not* state that "The magnet 33 is formed in substantially the same shape as the front and back plates 12 and 14 which can be *square*, rectangular, circular, or any other desired shape." (Emphasis and illustrative text added.) Instead, this portion of *Sariti* appears to list the entire universe of shapes that were envisioned, namely, (1) rectangular; (2) circular; and (3) any other desired shape. Since "square" is not included within this list, but at the same time was depicted in Figs. 1 and 2 as being the preferred embodiment of the *Sariti* invention, a fair reading of the *Sariti* reference as a whole suggests that the reference to "rectangular" in column 2, lines 56-58, was intended to correspond to those rectangles that were square or substantially square (as depicted in Figs. 1 and 2 of *Sariti*).

iv. The Examiner Mistakenly Asserts that the "Substantially Less Than" Limitation of the Claimed Invention is Expressly Taught by *Sariti*

A second important point relates to the manner in which the Examiner is using *Sariti* in support of the rejections under 35 U.S.C. § 103. The Examiner is not asserting that the language in the claims stating that "wherein each of the top plate, the plate-shaped magnet and the back plate has a width and a length, each width being *substantially less than* each respective length, thereby permitting installation of the speaker unit in a narrow space," would have been obvious in view of *Sariti*. Instead, the Examiner is asserting that this limitation from Appellants' claims is expressly taught by *Sariti*.[2]

This assertion is baseless, because neither figures 1 and 2 of *Sariti*, nor the text at column 3, lines 56-58, expressly teach any of the claimed combinations "wherein each of the top plate, the plate-shaped magnet and the back plate has a width and a length, each width being *substantially less than* each respective length, thereby permitting installation of the speaker unit in a narrow space." In figures 1 and 2, for example, the respective length and width of each of housing 48 (and each of front magnetic plate 12, ferrite magnet 33, and back magnetic plate 14) are *the same or, at best, substantially the same.* Moreover, while column 2, lines 56-58 of *Sariti* makes general reference to a "rectangular" shape, there is no disclosure whatsoever in this portion of *Sariti* of a specific type of rectangle having one side with a dimension that is *substantially less than* the other.[3] Thus, the Examiner's contention that *Sariti* expressly discloses a speaker unit "wherein each of the top plate, the plate-shaped magnet and the back plate has a

2. This can be understood, for example, from the manner in which the Examiner treats this limitation at page 3 of the Final Office Action, and from the absence in the Final Office Action of any discussion of why the "substantially less than" limitation in the claims would have been obvious to one of ordinary skill in the art.

3. As shown by housing 48 in Figs. 1 and 2 of *Sariti* itself, not all rectangles have one side that is *substantially less than* another. Instead, as evidenced by housing 48 in Figs. 1 and 2, a rectangle may *be square or substantially square*, with all of its sides being *equal* or *substantially equal to* one another.

width and a length, each width being *substantially less than* each respective length, thereby permitting installation of the speaker unit in a narrow space," is completely without merit (as are all the rejections in the Final Office Action based on this contention).

v. *Sariti* In View of *Nakamura*, Whether Taken Singularly or In Combination, Fail to Render Claims 2-4, 6, 8-9, 15, 20, and 22-24 Obvious

From the foregoing, it is indisputable that *Sariti* does *not* expressly disclose any of the claimed combinations wherein each of the top plate, the plate-shaped magnet and the back plate has a width that is *substantially less than* its respective length.[4] Appellants also submit that such claimed combinations would not have been obvious in view of *Sariti* or the other art of record.

In order to successfully prove obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine reference teachings. The teaching or suggestion to make the claimed combination must be found in the prior art, and not based on the Appellants' own disclosure. M.P.E.P. § 2142 (citing *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991)). In the present case, there is a *general* recognition at column 2, lines 56-58 of *Sariti*, that structure relating to frame 48, such as magnet 33 and front and back plates 12 and 14, can be "rectangular" or some other desired shape. Nonetheless, this portion of *Sariti* does not disclose or suggest the *specific* recitation required by all of the claims of a speaker unit "wherein each of the top plate, the plate-shaped magnet and the back plate has a width and a

4. Moreover, *Sariti* does not inherently disclose any such combinations. In order to make a showing of inherent disclosure, the magnetic circuit of *Sariti* would necessarily be required to have a width that is *substantially less than* its length; that is, it would not be possible to utilize a magnetic circuit structure in which the width was not *substantially less than* its length. *See Electro Medical Systems, S.A. v. Cooper Life Sciences, Inc.*, 34 F.3d 1048, 1052 (Fed. Cir. 1994) (stating that features alleged to be inherent must be shown to be *necessarily present* in the relied-upon reference, as would be recognized by persons of ordinary skill). Such a showing of inherent disclosure is precluded in the present case because, as clearly shown in figures 1 and 2, *Sariti* is capable of operating with a magnetic circuit structure that is *square* or *substantially square* (i.e., not having a width that is *substantially less than* its length).

length, each width being *substantially less than* each respective length, thereby permitting installation of the speaker unit in a narrow space." In other words, the *general* disclosure in *Sariti* does not in any way suggest the very *specific* structure recited in Appellants' claims. Moreover, such specific structure provides for particular advantages neither recognized nor envisioned by *Sariti*.

Referring back to the Summary of the Invention in Section 5, *supra*, a primary purpose of the present invention is to improve the dynamic sensitivity and overall performance of an elongate speaker unit having both a width dimension in the short axis direction and a length dimension in a long axis direction. This is achieved in the present invention by providing a magnetic circuit structure that extends along with the entire length of an elongate speaker in the long axis direction. Such structure is reflected in the language in each of the pending claims, which call for a speaker unit "wherein each of the top plate, the plate-shaped magnet and the back plate has a width, each width being *substantially less than* each respective length, thereby permitting installation of the speaker unit in a narrow space."

Sariti, on the other hand, is not concerned with elongate speaker units. Instead, *Sariti* primarily relates to the securing of front and back plates to the ferrite magnet within a *square or substantially square* speaker without interfering with the flow of flux between the ferrite magnet and the plates. *Sariti*, Figs. 1 and 2; and column 1, lines 9-45. Thus, the problem addressed by *Sariti* is not the same as that addressed by the present invention, namely fitting an elongate speaker into a narrow space in a television while at the same time increasing dynamic sensitivity, providing greater compactness, and fully utilizing the space occupied by the elongate speaker. That *Sariti* is not at all concerned with any of these problems, which are addressed and solved by

the present invention, strongly leads toward the conclusion that a finding of non-obviousness is in order.

In sum, one skilled in the art would not be motivated to modify *Sariti* to produce a speaker unit "wherein each of the top plate, the plate-shaped magnet and the back plate has a width and a length, each width being *substantially less than* each respective length, thereby permitting installation of the speaker unit in a narrow space." As discussed above, *Sariti* was completely unaware of the advantages provided by such structure in an elongate speaker environment[5] and therefore did not provide any suggestion or motivation for providing a speaker unit with a top plate, plate-shaped magnet and back plate having the above-quoted *specific* dimensions required by each of Appellants' claims. At best, *Sariti* only suggests a rectangle more in line with the square or substantially square structure depicted in figures 1 and 2 of that reference, and falling well short of the *specific* dimensions and advantages associated with and provided for by the present invention.

In contrast to the claimed invention as a whole, which is directed to a speaker unit having, *inter alia*, a magnetic circuit "wherein each of the top plate, the plate-shaped magnet and the back plate has a width and a length, each width being *substantially less* than each respective length, thereby permitting installation of the speaker unit in a narrow space," *Sariti,* considered as a whole, discloses a *square* or *substantially square* magnetic circuit wherein the respective width and length of each of the top plate, the magnet and back plate are the *same* or *substantially the same*. Indeed, the front magnetic plate 12, the ferrite magnet 33, and the back magnetic plate 14 of *Sariti* each have a width that is substantially equal to its respective length, as clearly shown

5. In fact, *Sariti* was concerned with a *square* or *substantially square* speaker environment, rather than one that was elongate.

in Figs. 1-3 of *Sariti*. Thus, *Sariti* does not teach or suggest "each width being substantially less than each respective length," as recited in each independent claim.

Moreover, *Nakamura* does not make up for these deficiencies in *Sariti*. More particularly, the Examiner does not rely on *Nakamura* as providing any suggestion that the "substantially less than" limitation required by each of the claims would have been obvious, nor does *Nakamura* provide any such suggestion. Accordingly, the § 103 rejections of claims 2-4, 6, 8-9, 15, 20, and 22-24 based on *Sariti* in view of *Nakamura* are incorrect and should be reversed.

There are additional problems with the § 103 rejections based on *Sariti* in view of *Nakamura*. Regarding claims 2-9, 14-16, 20-22, and 25-27, the Examiner has taken the position that the ferrite magnet 33 and back magnetic plate 14 of *Sariti* together correspond to the claimed "back plate having a rectangular shape and having an *integrally formed* upright pole on its center." *See* Final Office Action (Paper No. 18) § 3, page 3; s*ee also* Appendix B, independent claims 4, 6, 20, and 25 (emphasis added). However, in contrast to the claimed invention as a whole, which recites the upright pole as being *integrally formed*, *Sariti* teaches that the pole piece 24 is formed *separately* from the back plate 14 and then pressed into the opening 16 in the back plate 24. See, for example, pole 24 shown separate from back plate 14 in *Sariti*, Fig. 1. Accordingly, *Sariti* not only fails to teach or suggest the claimed back plate having an integrally formed upright pole, *Sariti* actually teaches away from this significant aspect of the invention, which may influence the performance or construction of the magnetic circuit, and hence the speaker unit.

The Examiner has not provided any rationale as to why an *integrally formed* upright pole would have been obvious in view of the opposite teaching of a *separate* pole in *Sariti*, nor does *Sariti* or *Nakamura* suggest or support such a conclusion. For at least this reason, the § 103

rejections of claims 2-9, 14-16, 20-22, and 25-27 based on *Sariti* in view of *Nakamura* are incorrect and should be reversed.

Dependent claims 3 and 9 are also not rendered obvious by *Sariti* taken in combination with *Nakamura*. Dependent claims 3 and 9 depend from independent claims 4 and 6, respectively, and in addition to the *substantially less than* and *integrally formed pole* limitations recited in their independent claims 4 and 6, each of dependent claims 3 and 9 additionally requires that the speaker unit be installed on either side of a television set.

The Examiner's position is that the combinations recited in claims 3 and 9 would have been obvious over *Sariti* in view of *Nakamura*. At page 4 of the Final Office Action, lines 13-14, "the Examiner takes Official Notice that providing a speaker unit to be installed on either side of a television is very well-known in the art." Based on this statement, the Examiner concludes that "it would have been obvious to one skilled in the art to provide the speaker unit of *Sariti* to be installed in either side of the television for applying the speaker system to an electronic device." Final Office Action, page 4, lines 15-17.

Nonetheless, even if it were known to provide a speaker unit on either side of a television set, Appellants submit that it would not have been obvious to have provided the *specific* speaker unit required by each of Appellants' claims, "wherein each of the top plate, the plate-shaped magnet and the back plate has a width and a length, each width being *substantially less than* each respective width, thereby permitting installation of the speaker unit in a narrow space," on either side of a television set. As discussed above, the speaker unit of the present invention is especially designed for and suited to fit within the narrow space at either side of a television set capable to receive an elongate structure, such as that in the present invention. In contrast, *Sariti* makes no teaching or suggestion of the use of a speaker unit in such an environment, or of an

elongate speaker unit such as that recited in the present claims that could appropriately fit in and function optimally in such as narrow space. Accordingly, the rejection of claims 3 and 9 based on *Sariti* taken in combination with *Nakamura* is incorrect and should be reversed.

vi. *Sariti, Nakamura, Lee et al.* or *Numa*, Whether Taken Singularly or In Combination, Fail to Render Claims 5, 7, 14, 16, 21, and 25-29 Obvious

Lee et al. and *Numa* do not make up for the aforementioned deficiencies in *Sariti* and *Nakamura*. Accordingly, for at least the reasons set forth above, all of the § 103 rejections applied to claims 2-9, 14-16, and 20-29 are incorrect and should be reversed.

B. The Examiner Has Failed to Establish a *Prima Facie* Case of Obviousness

The rejections of claims 2-4, 6, 8-9, 15, 20, and 22-24 under 35 U.S.C. § 103(a) based on *Sariti* in view of *Nakamura* and the rejections of claims 5, 7, 14, 16, 21, and 25-29 under 35 U.S.C. § 103(a) based on *Sariti* in view of *Nakamura* and further in view of *Lee et al.* or *Numa* should be reversed because the Examiner has failed to establish a *prima facie* case of obviousness, since not all of the claimed limitations are taught or suggested by the prior art and, further, because the Examiner has not cited proper motivation that would lead a skilled artisan to combine the cited references.

As is pointed out in M.P.E.P. § 2143.03, "[t]o establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and reasonable expectation of success must both be found in the

prior art, and not based on applicant's disclosure." M.P.E.P. § 2142 (citing *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991)). In this case, the Examiner has at least failed to identify a proper suggestion or motivation to combine the cited references and failed to consider all the claim limitations.

Appellants have addressed the failings of the Final Office Action with regard to limitations, such as the *substantially less than*, *integrally formed pole*, and *speaker units on either side of a television set* limitations, in the previous section of this Appeal Brief. Additional reasons why the Examiner has failed to set forth a proper *prima facie* case of obviousness are as follows.

The Examiner takes the position that, although "*Sariti* does not teach the diaphragm and the frame which have the elliptical portion as claimed,. . .providing an oval or elliptical speaker is very well-known in the art." *See* Final Office Action (Paper No. 18) § 3, page 4. For support, the Examiner relies on *Nakamura*: "*Nakamura* shows an oval or elliptical speaker (96, figures 11, 13)." *Id.* Appellants respectfully disagree that the claimed novel *combination* of features including the elliptical vibrating diaphragm and frame for supporting the diaphragm were well-known or would have been obvious to one of ordinary skill in the art, absent improper hindsight reasoning.

i. No Motivation Has Been Cited that Would Lead A Skilled Artisan to Combine *Nakamura* with *Sariti*

While it is true that *Nakamura* depicts an array of oval speakers in the figures cited by the Examiner, no motivation has been cited by the Examiner that would lead one of ordinary skill in the art to combine *Nakamura* with *Sariti*. Indeed, one of ordinary skill who is interested in inventing a compact speaker unit having improved dynamic sensitivity and greater compactness over prior art speaker units would be strongly disinclined to look to *Nakamura* because

Nakamura is directed to "a vertical speaker array," which is clearly bulky and large, not compact. *See, e.g., Nakamura*, column 1, line 5. Accordingly, the Examiner has failed to set forth a *prima facie* case of obviousness with regard to independent claims 4, 6, 20, and 25, and their dependent claims 2, 5, 7, 8, 14-16, 21, 22, 26, and 27, each of which are directed to a speaker unit comprising either an elliptical vibrating diaphragm and a rectangular frame for movably supporting the vibrating diaphragm, or a speaker unit comprising an elliptical vibrating diaphragm and a rectangular frame with an elliptical recess portion for movably supporting the vibrating diaphragm.

ii. The Cited Prior Art References Do Not Teach or Suggest All the Claim Limitations

Further, neither *Lee et al.* nor *Numa* cure the deficiencies of *Sariti* in view of *Nakamura*. For example, with respect to the rejections of independent claims 25 and 28, the Examiner acknowledges that *Sariti* in view of *Nakamura* "do not teach a second magnet as claimed." *See* Final Office Action (Paper No. 18) § 4, page 5. However, neither *Lee et al.* nor *Numa* teach or suggest, singularly or in combination, the second plate-shaped magnet configured in a non-square rectangular shape to cooperate with each of the top plate, the plate shaped magnet and the back plate, which each have a width substantially less than their respective length, thereby permitting installation of the speaker unit in a narrow space. For at least this reason, the Examiner has failed to establish a prima facie case of obviousness with regard to these claims.

For the aforementioned reasons, Appellants respectfully submit that *Sariti*, *Nakamura*, *Lee et al.*, and *Numa*, whether taken singularly or in combination, do not teach or suggest the novel combinations of features recited in independent claims 4, 6, 20, 23, 25 and 28, and their dependent claims 2, 3, 5, 7-9, 14-16, 21, 22, 24, 26, 27, and 29.

CONCLUSION

In view of the foregoing, Appellants respectfully request the reversal of the Examiner's rejections and allowance of the pending claims. If there are any other fees due in connection with the filing of this Brief, please charge the fees to our Deposit Account No. 50-0310. If a fee is required for an extension of time under 37 C.F.R. § 1.136 not accounted for above, such an extension is requested and the fee should also be charged to our deposit account.

Respectfully submitted,

MORGAN, LEWIS & BOCKIUS LLP

Dated: September 6, 2001

By: _____
Philip J. Hoffmann
Reg. No. 46,340

Customer No.: 009629
MORGAN, LEWIS & BOCKIUS LLP
1800 M Street, N.W.
Washington, D.C. 20036
202-467-7000

9. APPENDICES

APPENDIX A provides appealed claims ordered by number; APPENDIX B provides appealed claims ordered by dependency.

APPENDIX A - CLAIMS ORDERED BY NUMBER

2. (Amended) The speaker unit according to claim 4, wherein the frame structure, the top plate, the plate-shaped magnet and the back plate are arranged in parallel relation with one another.

3. (Amended) The speaker unit according to claim 4, wherein the speaker unit is installed on either side of a television display on a television set.

4. (Three Times Amended) A speaker unit comprising:

an elliptical vibrating diaphragm;

a cylindrical voice coil having a circular cross-section and secured at one end thereof on a center of the elliptical vibrating diaphragm;

a rectangular frame for movably supporting the vibrating diaphragm and having a through hole in its center;

a magnetic circuit formed by a top plate having a rectangular shape and having a through hole in its center, a plate-shaped magnet having a rectangular shape and having a circular through hole in its center, and a back plate having a rectangular shape and having an integrally formed upright pole on its center,

wherein each of the top plate, the plate-shaped magnet and the back plate has a width and a length, each width being substantially less than each respective length, thereby permitting installation of the speaker unit in a narrow space,

wherein the top plate, the plate-shaped magnet and the back plate each has a width that is equal to or narrower than a width of the rectangular frame in its shorter axis, and

wherein the top plate, the plate-shaped magnet and the back plate each has a length that is equal to or shorter than a length of the rectangular frame in its longer axis.

5. The speaker unit according to claim 4, further including:

a case made of a magnetic material and adapted to cooperate with the top plate to house the plate-shaped magnet and back plate, said case having a generally rectangular parallelepiped shape having an open upper side and having a width narrower than that of the frame.

6. (Three Times Amended) A speaker unit comprising:

an elliptical vibrating diaphragm;

a cylindrical voice coil having a circular cross-section and secured at one end thereof on a center of the elliptical vibrating diaphragm;

a rectangular frame with an elliptical recess portion for movably supporting the vibrating diaphragm and having a through hole in its center;

a magnetic circuit formed by a top plate having a rectangular shape and having a through hole in its center, a plate-shaped magnet having a rectangular shape and having a circular through hole in its center, and a back plate having a rectangular shape and having an integrally formed upright pole on its center,

wherein each of the top plate, the plate-shaped magnet and the back plate has a width and a length, each width being substantially less than each respective length, thereby permitting installation of the speaker unit in a narrow space,

wherein the top plate, the plate-shaped magnet and the back plate each has a width that is equal to or narrower than a width of the frame in its shorter axis, and

wherein the top plate, the plate-shaped magnet and the back plate each has a length that is equal to or shorter than a length of the frame in its longer axis.

7. The speaker unit according to claim 6, further including:

a case made of a magnetic material and adapted to cooperate with the top plate to house the plate-shaped magnet and back plate, said case having a generally rectangular parallelepiped shape having an open upper side and having a width narrower than that of the frame.

8. (Amended) The speaker unit according to claim 6, wherein the frame, the top plate, the plate-shaped magnet and the back plate are arranged parallel relation to one another.

9. The speaker unit according to claim 6, wherein the speaker unit is installed on either side of a television display on a television set.

14. (Amended) The speaker unit of claim 4, wherein the plate-shaped magnet includes a first plate-shaped magnet having a rectangular shape and having a circular through hole in its center and a second plate-shaped magnet on an opposite side of the back plate from the first plate-shaped magnet, the second plate-shaped magnet having a circular hole through its center.

15. (Amended) The speaker unit of claim 4, wherein the magnetic circuit has the same shape as the rectangular frame.

16. The speaker unit of claim 6, wherein the plate-shaped magnet includes a first plate-shaped magnet having a rectangular shape and having a circular through hole in its center and a second plate-shaped magnet on an opposite side of the back plate from the first plate-shaped magnet, the second plate-shaped magnet having a circular hole through its center.

20. (Amended) A speaker unit comprising:

an elliptical vibrating diaphragm;

a cylindrical voice coil having a circular cross-section and secured at one end thereof on a center of the elliptical vibrating diaphragm;

a rectangular frame for movably supporting the vibrating diaphragm and having a through hole in its center;

a rectangular magnetic circuit formed by a top plate having a rectangular shape and having a through hole in its center, a plate-shaped magnet having a rectangular shape and having a circular through hole in its center, and a back plate having a rectangular shape and having an integrally formed upright pole on its center,

wherein each of the top plate, the plate-shaped magnet and the back plate has a width and a length, each width being substantially less than each respective length, thereby permitting installation of the speaker unit in a narrow space, and

wherein the top plate, the plate-shaped magnet and the back plate each has a width that is narrower than a width of the rectangular frame in its shorter axis.

21. The speaker unit of claim 20, wherein the plate-shaped magnet includes a first plate-shaped magnet having a rectangular shape and having a circular through hole in its center and a

second plate-shaped magnet on an opposite side of the back plate from the first plate-shaped magnet, the second plate-shaped magnet having a circular hole through its center.

22. (Twice Amended) The speaker unit of claim 20, wherein the top plate, the plate-shaped magnet and the back plate each has a length that is equal to or shorter than a length of the rectangular frame in its longer axis.

23. (Amended) A speaker unit comprising:

an elliptical vibrating diaphragm;

a cylindrical voice coil having a circular cross-section and secured at one end thereof on a center of the elliptical vibrating diaphragm;

a rectangular frame having an elliptical recess portion for movably supporting the vibrating diaphragm and having a through hole in its center;

a magnetic circuit formed by a top plate having a rectangular shape and having a through hole in its center, a plate-shaped magnet having a rectangular shape and having a circular through hole in its center, and a back plate having a rectangular shape and having an upright pole on its center,

wherein each of the top plate, the plate-shaped magnet and the back plate has a width and a length, each width being substantially less than each respective length, thereby permitting installation of the speaker unit in a narrow space, and

wherein the top plate, the plate-shaped magnet and the back plate each has a width that is narrower than a width of the frame in its shorter axis.

24. (Amended) The speaker unit of claim 23, wherein the top plate, the plate-shaped magnet and the back plate each has a length that is equal to or shorter than a length of the frame in its longer axis.

25. (Amended) A speaker unit comprising:

an elliptical vibrating diaphragm;

a cylindrical voice coil having a circular cross-section and secured at one end thereof on a center of the elliptical vibrating diaphragm;

a rectangular frame for movably supporting the vibrating diaphragm and having a through hole in its center;

a magnetic circuit formed by a top plate having a rectangular shape and having a through hole in its center, a first plate-shaped magnet having a rectangular shape and having a circular through hole in its center, a back plate having a rectangular shape and having an integrally formed upright pole on its center, and a second plate-shaped magnet on an opposite side of the back plate from the first plate-shaped magnet,

wherein each of the top plate, the plate-shaped magnet and the back plate has a width and a length, each width being substantially less than each respective length, thereby permitting installation of the speaker unit in a narrow space, and

wherein the top plate, the plate-shaped magnet and the back plate each has a width that is narrower than a width of the rectangular frame in its shorter axis.

26. (Twice Amended) The speaker unit of claim 25, wherein the top plate, the plate-shaped magnet and the back plate each has a length that is equal to or shorter than a length of the rectangular frame in its longer axis.

27. The speaker unit of claim 25, wherein the magnetic circuit has the same shape as the rectangular frame.

28. (Amended) A speaker unit comprising:

an elliptical vibrating diaphragm;

a cylindrical voice coil having a circular cross-section and secured at one end thereof on a center of the elliptical vibrating diaphragm;

a rectangular frame having an elliptical recess portion for movably supporting the vibrating diaphragm and having a through hole in its center;

a magnetic circuit formed by a top plate having a rectangular shape and having a through hole in its center, a first plate-shaped magnet having a rectangular shape and having a circular through hole in its center, a back plate having a rectangular shape and having an upright pole on its center, and a second plate-shaped magnet on an opposite side of the back plate from the first plate-shaped magnet,

wherein each of the top plate, the plate-shaped magnet and the back plate has a width and a length, each width being substantially less than each respective length, thereby permitting installation of the speaker unit in a narrow space, and

wherein the top plate, the plate-shaped magnet and the back plate each has a width that is narrower than a width of the frame in its shorter axis.

29. (Amended) The speaker unit of claim 28, wherein the top plate, the plate-shaped magnet and the back plate each has a length that is equal to or shorter than a length of the frame in its longer axis.

APPENDIX B - CLAIMS ORDERED BY DEPENDENCY

4. (Three Times Amended) A speaker unit comprising:

an elliptical vibrating diaphragm;

a cylindrical voice coil having a circular cross-section and secured at one end thereof on a center of the elliptical vibrating diaphragm;

a rectangular frame for movably supporting the vibrating diaphragm and having a through hole in its center;

a magnetic circuit formed by a top plate having a rectangular shape and having a through hole in its center, a plate-shaped magnet having a rectangular shape and having a circular through hole in its center, and a back plate having a rectangular shape and having an integrally formed upright pole on its center,

wherein each of the top plate, the plate-shaped magnet and the back plate has a width and a length, each width being substantially less than each respective length, thereby permitting installation of the speaker unit in a narrow space,

wherein the top plate, the plate-shaped magnet and the back plate each has a width that is equal to or narrower than a width of the rectangular frame in its shorter axis, and

wherein the top plate, the plate-shaped magnet and the back plate each has a length that is equal to or shorter than a length of the rectangular frame in its longer axis.

2. (Amended) The speaker unit according to claim 4, wherein the frame structure, the top plate, the plate-shaped magnet and the back plate are arranged in parallel relation with one another.

3. (Amended) The speaker unit according to claim 4, wherein the speaker unit is installed on either side of a television display on a television set.

5. The speaker unit according to claim 4, further including:

a case made of a magnetic material and adapted to cooperate with the top plate to house the plate-shaped magnet and back plate, said case having a generally rectangular parallelepiped shape having an open upper side and having a width narrower than that of the frame.

14. (Amended) The speaker unit of claim 4, wherein the plate-shaped magnet includes a first plate-shaped magnet having a rectangular shape and having a circular through hole in its center and a second plate-shaped magnet on an opposite side of the back plate from the first plate-shaped magnet, the second plate-shaped magnet having a circular hole through its center.

15. (Amended) The speaker unit of claim 4, wherein the magnetic circuit has the same shape as the rectangular frame.

6. (Three Times Amended) A speaker unit comprising:

an elliptical vibrating diaphragm;

a cylindrical voice coil having a circular cross-section and secured at one end thereof on a center of the elliptical vibrating diaphragm;

a rectangular frame with an elliptical recess portion for movably supporting the vibrating diaphragm and having a through hole in its center;

a magnetic circuit formed by a top plate having a rectangular shape and having a through hole in its center, a plate-shaped magnet having a rectangular shape and having a circular through hole in its center, and a back plate having a rectangular shape and having an integrally formed upright pole on its center,

wherein each of the top plate, the plate-shaped magnet and the back plate has a width and a length, each width being substantially less than each respective length, thereby permitting installation of the speaker unit in a narrow space,

wherein the top plate, the plate-shaped magnet and the back plate each has a width that is equal to or narrower than a width of the frame in its shorter axis, and

wherein the top plate, the plate-shaped magnet and the back plate each has a length that is equal to or shorter than a length of the frame in its longer axis.

7. The speaker unit according to claim 6, further including:

a case made of a magnetic material and adapted to cooperate with the top plate to house the plate-shaped magnet and back plate, said case having a generally rectangular parallelepiped shape having an open upper side and having a width narrower than that of the frame.

8. (Amended) The speaker unit according to claim 6, wherein the frame, the top plate, the plate-shaped magnet and the back plate are arranged parallel relation to one another.

9. The speaker unit according to claim 6, wherein the speaker unit is installed on either side of a television display on a television set.

16. The speaker unit of claim 6, wherein the plate-shaped magnet includes a first plate-shaped magnet having a rectangular shape and having a circular through hole in its center and a second plate-shaped magnet on an opposite side of the back plate from the first plate-shaped magnet, the second plate-shaped magnet having a circular hole through its center.

20. (Amended) A speaker unit comprising:

an elliptical vibrating diaphragm;

a cylindrical voice coil having a circular cross-section and secured at one end thereof on a center of the elliptical vibrating diaphragm;

a rectangular frame for movably supporting the vibrating diaphragm and having a through hole in its center;

a rectangular magnetic circuit formed by a top plate having a rectangular shape and having a through hole in its center, a plate-shaped magnet having a rectangular shape and having a circular through hole in its center, and a back plate having a rectangular shape and having an integrally formed upright pole on its center,

wherein each of the top plate, the plate-shaped magnet and the back plate has a width and a length, each width being substantially less than each respective length, thereby permitting installation of the speaker unit in a narrow space, and

wherein the top plate, the plate-shaped magnet and the back plate each has a width that is narrower than a width of the rectangular frame in its shorter axis.

21. The speaker unit of claim 20, wherein the plate-shaped magnet includes a first plate-shaped magnet having a rectangular shape and having a circular through hole in its center and a

second plate-shaped magnet on an opposite side of the back plate from the first plate-shaped magnet, the second plate-shaped magnet having a circular hole through its center.

22. (Twice Amended) The speaker unit of claim 20, wherein the top plate, the plate-shaped magnet and the back plate each has a length that is equal to or shorter than a length of the rectangular frame in its longer axis.

23. (Amended) A speaker unit comprising:

an elliptical vibrating diaphragm;

a cylindrical voice coil having a circular cross-section and secured at one end thereof on a center of the elliptical vibrating diaphragm;

a rectangular frame having an elliptical recess portion for movably supporting the vibrating diaphragm and having a through hole in its center;

a magnetic circuit formed by a top plate having a rectangular shape and having a through hole in its center, a plate-shaped magnet having a rectangular shape and having a circular through hole in its center, and a back plate having a rectangular shape and having an upright pole on its center,

wherein each of the top plate, the plate-shaped magnet and the back plate has a width and a length, each width being substantially less than each respective length, thereby permitting installation of the speaker unit in a narrow space, and

wherein the top plate, the plate-shaped magnet and the back plate each has a width that is narrower than a width of the frame in its shorter axis.

24. (Amended) The speaker unit of claim 23, wherein the top plate, the plate-shaped magnet and the back plate each has a length that is equal to or shorter than a length of the frame in its longer axis.

25. (Amended) A speaker unit comprising:

an elliptical vibrating diaphragm;

a cylindrical voice coil having a circular cross-section and secured at one end thereof on a center of the elliptical vibrating diaphragm;

a rectangular frame for movably supporting the vibrating diaphragm and having a through hole in its center;

a magnetic circuit formed by a top plate having a rectangular shape and having a through hole in its center, a first plate-shaped magnet having a rectangular shape and having a circular through hole in its center, a back plate having a rectangular shape and having an integrally formed upright pole on its center, and a second plate-shaped magnet on an opposite side of the back plate from the first plate-shaped magnet,

wherein each of the top plate, the plate-shaped magnet and the back plate has a width and a length, each width being substantially less than each respective length, thereby permitting installation of the speaker unit in a narrow space, and

wherein the top plate, the plate-shaped magnet and the back plate each has a width that is narrower than a width of the rectangular frame in its shorter axis.

26. (Twice Amended) The speaker unit of claim 25, wherein the top plate, the plate-shaped magnet and the back plate each has a length that is equal to or shorter than a length of the rectangular frame in its longer axis.

27. The speaker unit of claim 25, wherein the magnetic circuit has the same shape as the rectangular frame.

28. (Amended) A speaker unit comprising:

an elliptical vibrating diaphragm;

a cylindrical voice coil having a circular cross-section and secured at one end thereof on a center of the elliptical vibrating diaphragm;

a rectangular frame having an elliptical recess portion for movably supporting the vibrating diaphragm and having a through hole in its center;

a magnetic circuit formed by a top plate having a rectangular shape and having a through hole in its center, a first plate-shaped magnet having a rectangular shape and having a circular through hole in its center, a back plate having a rectangular shape and having an upright pole on its center, and a second plate-shaped magnet on an opposite side of the back plate from the first plate-shaped magnet,

wherein each of the top plate, the plate-shaped magnet and the back plate has a width and a length, each width being substantially less than each respective length, thereby permitting installation of the speaker unit in a narrow space, and

wherein the top plate, the plate-shaped magnet and the back plate each has a width that is narrower than a width of the frame in its shorter axis.

29. (Amended) The speaker unit of claim 28, wherein the top plate, the plate-shaped magnet and the back plate each has a length that is equal to or shorter than a length of the frame in its longer axis.